- 1. A diagnostic method for *in vivo* detection of cancerous epithelial cells by selective marking of the mitochondria thereof, comprising the step of delivering to the epithelium a cationic supravital mitochondrial marking agent.
- 2. A method for selective killing of epithelial cancer cells comprising the step of delivering to epithelial cancer cells a cationic supravital mitochondrial marking agent.
- 3. The method of claim 2 in which the agent is the reaction product of a cationic supravital mutochondrial marking agent and a cancer chemotherapeutic drug.
- 4. The method of claim 2 in which the agent is delivered to epithelial cancer cells in combination with another cancer chemotherapeutic drug that selectively kills cancer cells by a different mechanism than the mechanism by which the agent kills cancer cells.
- 5. The methods of claims 1 or 2, in which the cationic supravital mitochondrial marking agent is selected to provide a molecular structure that does not hinder attraction of the positive charge of the marking agent molecule by the negative charges on the mitochondrial membranes.

- 6 The methods of claims 1 or 2, in which the cationic supravital mitochondrial marking agent is selected to provide a molecular structure that permits the marking agent to bind to a specific site in the mitochondria.
- 7. The methods of claims 1 or 2, in which the cationic supravital mitochondrial marking agent is selected to provide a structure that will intercalate into or stack along the mitochondrial DNA.
- 8. The methods of claims 1 or 2, in which the cationic supravital mitochondrial marking agent is selected to provide a molecular structure that affects its reduction potential to permit it to change to the uncharged leuco form prior to, during, or after entry into the mitochondria.
- 9. The methods of claims 1 or 2, in which the cationic supravital mitochondrial marking agent is selected to provide a molecular structure that will deprotonate at physiological pH.
- 10. The methods of claims 1 or 2, in which the cationic supravital mitochondrial marking agent has a log P of 0-5.